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# UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 C.F.R. § 1.53(b))

Attorney Docket No. 2811  
First Inventor or Application Identifier Shigeto Igarashi  
Title SIGNAL AMPLIFYING CIRCUIT IN CCD CAMERA  
Express Mail Label No. EL405905361US

## APPLICATION ELEMENTS

See MPEP chapter 800 concerning utility patent application contents.

1. ☒ Fee Transmittal Form (e.g., PTO/SB/17)  
(Submit an original and a duplicate for fee processing)
2. ☒ Specification [Total Pages 13]  
(preferred arrangement set forth below)  
- Descriptive title of the invention  
- Cross References to Related Applications  
- Statement Regarding Fed sponsored R & D  
- Reference to Microfiche Appendix  
- Background of the invention  
- Brief Summary of the invention  
- Brief Description of the Drawings (if filed)  
- Detailed Description  
- Claim(s)  
- Abstract of the Disclosure
3. ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets 5]
4. Oath or Declaration [Total Pages 3]  
a. ☒ Newly executed (original or copy)  
b. ☐ Copy from a prior application (37 C.F.R. § 1.63(d))  
(for continuation/divisional with Box 16 completed)  
i. ☐ DELETION OF INVENTOR(S)  
Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).

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5. ☐ Microfiche Computer Program (Appendix)  
6. Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)  
a. ☐ Computer Readable Copy  
b. ☐ Paper Copy (identical to computer copy)  
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## ACCOMPANYING APPLICATION PARTS

7. ☒ Assignment Papers (cover sheet & document(s))  
8. ☐ 37 C.F.R. § 3.73(b) Statement of Power of Attorney (when there is an assignee)  
9. ☐ English Translation Document (if applicable)  
10. ☐ Information Disclosure Statement (IDS)/PTO-1449 [Copies of IDS Citations]  
11. ☐ Preliminary Amendment  
12. ☒ Return Receipt Postcard (MPEP 503) (Should be specifically itemized)  
13. ☒ Small Entity Statement(s) filed in prior application, Status still proper and desired (PTO/SB/09-12)  
14. ☒ Certified Copy of Priority Document(s) (if foreign priority is claimed)  
15. ☐ Other:

16. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment.

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No. \_\_\_\_\_  
Prior application information. Examiner \_\_\_\_\_ Group / Art Unit. \_\_\_\_\_

For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

## 17. CORRESPONDENCE ADDRESS

☐ Customer Number or Bar Code Label

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Signature [Signature] Date 1/25/2000

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09/491581  
01/25/00

Applicant or Patentee: Shigeto Igarashi  
Serial or Patent No.: \_\_\_\_\_  
Filed or Issued: \_\_\_\_\_  
Title: SIGNAL AMPLIFYING CIRCUIT IN CCD CAMERA

Attorney's  
Docket No.: 2811

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS  
(37 CFR 1.9(f) & 1.27(c))--SMALL BUSINESS CONCERN

I hereby declare that I am

☐ the owner of the small business concern identified below:

☒ an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF SMALL BUSINESS CONCERN WATEC CO., LTD.  
ADDRESS OF SMALL BUSINESS CONCERN 254-2, Nihonkoku, Daihoji,  
Tsuruoka-Shi, Yamagata-Ken, Japan

I hereby declare that the above identified small business concern qualifies as a small business concern as defined in 13 CFR 121.12, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees to the United States Patent and Trademark Office, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention, entitled SIGNAL AMPLIFYING CIRCUIT IN CCD CAMERA by inventor(s) Shigeto Igarashi described in

☒ the specification filed herewith

☐ application serial no. \_\_\_\_\_, filed \_\_\_\_\_

☐ patent no. \_\_\_\_\_, issued \_\_\_\_\_

If the rights held by the above identified small business concern are not exclusive, each individual, concern or organization having rights in the invention is listed below\* and no rights to the invention are held by any person, other than the inventor, who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person made the invention, or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d), or a nonprofit organization under 37 CFR 1.9(e). \*NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

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I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

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NAME OF PERSON SIGNING Shigemi Igarashi  
TITLE OF PERSON IF OTHER THAN OWNER President  
ADDRESS OF PERSON SIGNING 254-2, Nihonkoku, Daihoji,  
Tsuruoka-Shi, Yamagata-Ken, Japan

SIGNATURE Shigemi Igarashi DATE January 19, 2000

SPECIFICATION

TITLE: SIGNAL AMPLIFYING CIRCUIT IN CCD CAMERA

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a signal amplifying circuit in a CCD (Charge Couple Device) camera using an area image sensor for use in a device such as a monitoring video camera.

2. Background Information

Heretofore, as shown in Fig. 5, in a conventional CCD camera, a light signal passed through lens a is transduced into signal S<sub>1</sub>, by CCD sensor b. The signal S<sub>1</sub> is a sampling held in CDS c as signal S<sub>1</sub>, the signal S<sub>1</sub> is processed in processing circuit d and output from signal input part 1 as signal S<sub>2</sub> as shown in Fig. 6.

This invention relates to processing circuit d which is explained in more detail. As shown in Fig. 5, OSC (oscillator) 2 generates a synchronizing signal, timing generator 3 drives a CCD, V driver 4 is an iris signal S<sub>4</sub> output from processing circuit d for an automatic iris.

To obtain composite video signal S<sub>1</sub>, processing circuit d is constructed as shown in Fig. 7. Input signal S<sub>1</sub> is amplified to a predetermined level V<sub>1</sub> in AGC amplifier e and transduced into constant level signal S<sub>3</sub>. On the other hand, signal S<sub>4</sub> amplified in fixed amplifier f is output as a control signal of

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Date: January 15, 2000

By: [Signature]

David O'Reilly, Reg. No. 26,102

1 a lens having an automatic iris or control signal for inputting  
2 a light limiting circuit.

3 Operation of above device is as follows:

4 Signal S<sub>3</sub>, AGC, amplified in AGC amplifier e is passed by  
5 low pass filter g, to remove a useless wide frequency component,  
6 passed through gamma correction circuit h, white clip circuit i,  
7 composite sync mixer j, driver k (matching to 75 ohm line) and  
8 output as a video output signal S<sub>2</sub> shown in Fig. 6. In the  
9 composite video output signal S<sub>2</sub>, the S/N (signal to noise)  
10 ratio is set to more than 40dB(1%). This invention concerns the  
11 S/N ratio.

12 Problems to be solved by this invention.

13 If an object is illuminated by a sufficient light source of  
14 more than 0.02 lux, the S/N ratio is kept more than 40dB(1%) and  
15 no problems occur, but in low illumination such as night,  
16 photographing is impossible. However, in night photographing,  
17 it is desired to broaden the range of illuminating until 0.02  
18 lux under a wrong S/N ratio.

19 BRIEF DESCRIPTION OF THE INVENTION

20 This invention intends to eliminate said drawbacks, and an  
21 object of this invention is to provide a signal amplifying  
22 circuit in a CCD (Charge Couple Device) camera in which under a  
23 sufficient object illuminating conditions (normally more than  
24 0.02 lux) photographing normal circuit construction (Figs. 5 and  
25 7), while under a low object illuminating condition,

1     photographing while ignoring the S/N ratio, by inserting  
2     auxiliary amplifying circuit m or raising the amplification  
3     factor of AGC amplifier e.

4             Namely, in this invention when photographing at normal  
5     object illumination, the photograph is at a high S/N ratio and  
6     high grade, but when photographing at a low object illumination,  
7     the photograph is at high noise and ignoring the utility 20db  
8     S/N ratio (noise component 10%).

9             The detection means of said low object illumination is an  
10    output level of fixed amplifier f or lowering of the video  
11    output level (Fig. 2).

12            The above and other objects, advantages and novel features  
13    of this invention will be more fully understood from the  
14    following detailed description and the accompanying drawings, in  
15    which like reference numbers indicate like or similar parts  
16    throughout wherein:

17    BRIEF DESCRIPTION OF THE DRAWINGS

18            Fig. 1 is a block diagram of a first embodiment of this  
19    invention.

20            Fig. 2 (A) shows the relation of object Lux (abscissa) and  
21    video output voltage (ordinate) of a prior device (dotted line)  
22    and this invention. (B) shows the relation of object Lux  
23    (abscissa) and S/N ratio (ordinate) of this invention. (C)  
24    shows the relation of object Lux (abscissa) and gain of  
25    auxiliary amplifying circuit m (ordinate) of this invention.

1 Fig. 3 is a block diagram of a second embodiment of this  
2 invention.

3 Fig. 4 is a block diagram of a third embodiment of this  
4 invention.

5 Fig. 5 is a block diagram of a conventional CCD camera.

6 Fig. 6 is a graph of video output signal  $S_2$ .

7 Fig. 7 is a block diagram of the processing circuit d in a  
8 conventional CCD camera.

9 DETAILED DESCRIPTION OF THE INVENTION

10 According to claim 1 of this invention, signal processing  
11 circuit d of a video camera using a CCD, area sensor etc. is  
12 increased in an auxiliary amplifying circuit m, the  
13 amplification degree of the auxiliary amplifying circuit m being  
14 raised according to necessity so as to maintain the video output  
15 voltage at a predetermined voltage and vary the amplification  
16 degree of the processing circuit d so that the range of  
17 photographing is broadened.

18 According to claim 2 of this invention, signal processing  
19 circuit d of a video camera using a CCD, area sensor etc.  
20 provides an automatic gain control auxiliary amplifying circuit  
21  $m_1$  of high S/N ratio, low amplification degree and automatic  
22 gain control auxiliary amplifying circuit  $m_2$  of low S/N ratio,  
23 high amplification degree, according to necessity, it is  
24 possible to selectively use automatic gain control auxiliary  
25 amplifying circuit  $m_1$  of high S/N ratio or automatic gain

1 control auxiliary amplifying circuit  $m_2$  of low S/N ratio.

2 According to claim 3 of this invention, signal processing  
3 circuit d of a video camera using a CCD, area sensor etc. the  
4 function of said two automatic gain control auxiliary amplifying  
5 circuits  $m_1$  and  $m_2$  in claim 2 are included in one AGC amplifying  
6 circuit em which functions are switched by outer switching.

7 According to claim 4 of this invention, to detect the  
8 change of object illumination, the output voltage or the signal  
9 level in signal amplifying process is detected.

10 Embodiments.

11 First Embodiment.

12 Fig. 1 illustrates the first embodiment of this invention.

13 As shown in Fig. 1, in this invention, auxiliary amplifying  
14 circuit m is newly inserted between low pass filter g and gamma  
15 correction circuit h in a conventional circuit shown in Figs. 5  
16 and 7 which raises the amplification degree by detecting the  
17 variation in the video output voltage (Fig. 2). The  
18 amplification degree of the auxiliary amplifying circuit m  
19 changes from 0 dB to 20 dB.

20 Operation of above device is as follows:

21 In normal photography, the amplification degree is 0 dB.

22 AGC level detector r monitors video output signal  $S_2$  and if  
23 the image signal is lower than 0.72v, the output of level  
24 detector r changes and the amplification degree of the auxiliary  
25 amplifying circuit m increases.

1 By said feedback operation, the video output voltage is  
2 maintained at a regular voltage of 0.72v.

3 In the first embodiment, auxiliary amplifying circuit m is  
4 newly inserted between low pass filter g and gamma correction  
5 circuit h but may be inserted between gamma correction circuit h  
6 and white clip circuit i, or between AGC amplifier e and low  
7 pass filter g, or between signal input part 1 and AGC amplifier  
8 e.

9 The above relationships are shown in the graphs of Figs. 2  
10 (A), (B), (C). Fig. 2 (A) shows the relationship of object Lux  
11 (abscissa) and video output voltage (ordinate) of the prior  
12 device (dotted line) compared with this invention. The hatched  
13 lines shows the broadened range for photographs in this  
14 invention. Fig. 2 (B) shows the relationship of object Lux  
15 (abscissa) and S/N ratio (ordinate) of this invention. Fig. 2  
16 (C) shows the relationship of object Lux (abscissa) and gain of  
17 auxiliary amplifying circuit m (ordinate) of this invention. In  
18 the prior device, as shown in Fig. 2 (A), dotted line indicates  
19 the prior device, photographing is impossible at object Lux of  
20 0.02 Lux (S/N ratio is 40 dB).

21 In this invention, as shown in Fig. 2 (C), the object Lux  
22 is lower than 0.02 Lux, the amplification degree increases, and  
23 photographing is possible until an object of Lux 0.002 Lux. But  
24 the S/N ratio is lowered to 25 dB as shown in Fig. 2 (B).

25 Second Embodiment.

Fig. 3 shows the second embodiment of this invention.

As shown in Fig. 2, in the second embodiment, in signal processing circuit d of video camera using a CCD, area sensor etc. an automatic gain control auxiliary amplifying circuit  $m_1$  of high S/N ratio amplification degree 0 dB to 26 dB and an automatic gain control auxiliary amplifying circuit  $m_2$  of low S/N ratio amplification degree 0 dB to 46 dB are provided. According to necessity, it is possible to selectively using automatic gain control auxiliary amplifying circuit  $m_1$  of high S/N ratio or automatic gain control auxiliary amplifying circuit  $m_2$  of low S/N ratio by switch S.  $V_{DD}$  is an electric source.

As shown in Fig. 2 (C), the object illumination is higher than 0.02 Lux, amplification degree automatic gain control auxiliary amplifying circuit  $m_1$  of high S/N and low amplification degree 0 dB to 26 dB works. For an object illumination lower than 0.02 Lux, high amplification degree automatic gain control auxiliary amplifying circuit  $m_2$  works, and the amplification degree increases. However the S/N ratio is lower than 25 dB as shown in Fig. 2 (B).

Third Embodiment.

Fig. 4 shows the third embodiment of this invention.

As shown in Fig. 4, in the third embodiment, two automatic gain control auxiliary amplifying circuits  $m_1$   $m_2$  are provided in one AGC amplifying circuit em and their amplification degrees are changed by switch S and voltage or current.

1 Maximum amplification degrees are 0 dB to 26 dB and 0 dB to  
2 46 dB and their amplification degrees are selected by switch S.  
3 Level of entering light are detected by level detecting circuit  
4 r and controls the switch S and set the amplification degree to  
5 a suitable value.

6 As explained in the construction, the same effects are  
7 accomplished.

8 Effect of this invention.

9 According to this invention, in the case of sufficiently  
10 bright object, photographing is performed by conventional  
11 circuit, in the case of insufficient bright object, inserting  
12 auxiliary amplifying circuit  $m$ ,  $m_1$ ,  $m_2$  or  $em$ , ignoring the S/N  
13 ratio, and raising the amplification degree, in the case of a  
14 sufficient bright object, photographing is performed by high S/N  
15 ratio, and high degree, in the case of insufficient bright  
16 object, inserting auxiliary amplifying circuit  $m$ ,  $m_1$ ,  $m_2$  or  $em$ ,  
17 and ignoring S/N ratio, utility photographing is possible.  
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25

WHAT IS CLAIMED IS:

1. In a signal amplifying circuit for a CCD (Charge Couple Device) camera, the improvement comprising providing an auxiliary amplifying circuit  $m$ , amplification of the degree of the auxiliary amplifying circuit  $m$  being raised according to necessity so as to maintain the video output voltage at a predetermined voltage and vary the amplification degree of the processing circuit (d) to broaden the range for photographing.

2. In a signal amplifying circuit for a CCD (Charge Couple Device) camera the improvement comprising providing an automatic gain control auxiliary amplifying circuit ( $m_1$ ) having a high S/N ratio, and low amplification degree and an automatic gain control auxiliary amplifying circuit ( $m_2$ ) of low S/N ratio, and high amplification degree, and selectively using said automatic gain control auxiliary amplifying circuit ( $m_1$ ) of high S/N ratio or said automatic gain control auxiliary amplifying circuit ( $m_2$ ) of low S/N ratio as needed.

3. A signal amplifying circuit in a CCD (Charge Couple Device) camera as claimed in claim 2, including providing in a signal processing circuit (d) of a video camera with the functions of said two automatic gain control auxiliary amplifying circuits ( $m_1$ ,  $m_2$ ) in one AGC amplifying circuit  $em$ , switching said functions by outer switching.

4. In a signal amplifying circuit for a CCD (Charge Couple Device) camera as claimed in claim 1, including providing a

detecting means to detect a change of object illumination, and detecting the output voltage or the signal level in signal amplifying process.

5. In a signal amplifying circuit for a CCD (Charge Couple Device) camera as claimed in claim 2, including providing a detecting means to detect a change of object illumination, and detecting the output voltage or the signal level in signal amplifying process.

6. In a signal amplifying circuit for a CCD (Charge Couple Device) camera as claimed in claim 3, including providing a detecting means to detect a change of object illumination, and detecting the output voltage or the signal level in signal amplifying process.

7. In a signal amplifying and processing circuit for a CCD camera the improvement comprising; an auxiliary amplifying circuit (m) in said CCD camera signal amplifying circuit; said auxiliary amplifying circuit constructed to increase the amplification during low light levels to maintain the video output voltage at a predetermined voltage and vary the amplification degree of the CCD camera processing circuit; whereby the range of photography is broadened.

8. The circuit according to Claim 7 in which said auxiliary amplifying circuit comprises an automatic gain control auxiliary amplifying circuit ( $m_1$ ) having a high S/N ratio and low amplification degree and an automatic gain control auxiliary

amplifying circuit ( $m_2$ ) having a low S/N ratio and high amplification degree; and selective means for selecting said high S/N auxiliary amplifier or said low S/N auxiliary amplifier.

9. The circuit according to Claim 8 in which said high S/N auxiliary amplifier and low S/N auxiliary amplifier are incorporated into an existing AGC amplifier in said CCD camera amplifying and processing circuit; said selective means including a switch for switching between said high S/N auxiliary amplifier and low S/N auxiliary amplifier.

10. The circuit according to Claim 9 in which said selective means includes a detector for detecting object illumination and signal level output voltage of said CCD signal amplifying and processing circuit.

11. The circuit according to Claim 8 in which said selective means includes a detector for detecting object illumination and signal level output voltage of said CCD signal amplifying and processing circuit.

12. The circuit according to Claim 7 in which said selective means includes a detector for detecting object illumination and signal level output voltage of said CCD signal amplifying and processing circuit.

13. A method of improving a CCD camera signal amplifying and processing circuit comprising; inserting an auxiliary amplifying circuit in said CCD camera signal processing circuit

for maintaining the video output voltage at a predetermined level during low light conditions and vary the amplification degree whereby the range of photography is broadened.

14. The method according to Claim 13 comprising insert an automatic gain control auxiliary amplifying circuit ( $m_1$ ) having a high S/N ratio and low amplification of an automatic gain control auxiliary amplifying circuit ( $m_2$ ) having a low S/N ratio and high amplification; and selecting an automatic gain control auxiliary amplifier as needed.

15. The method according to Claim 14 including inserting said pair of automatic gain control amplifier ( $m_1$ ,  $m_2$ ) in existing AGC amplifier in said CCD camera signal processing circuit.

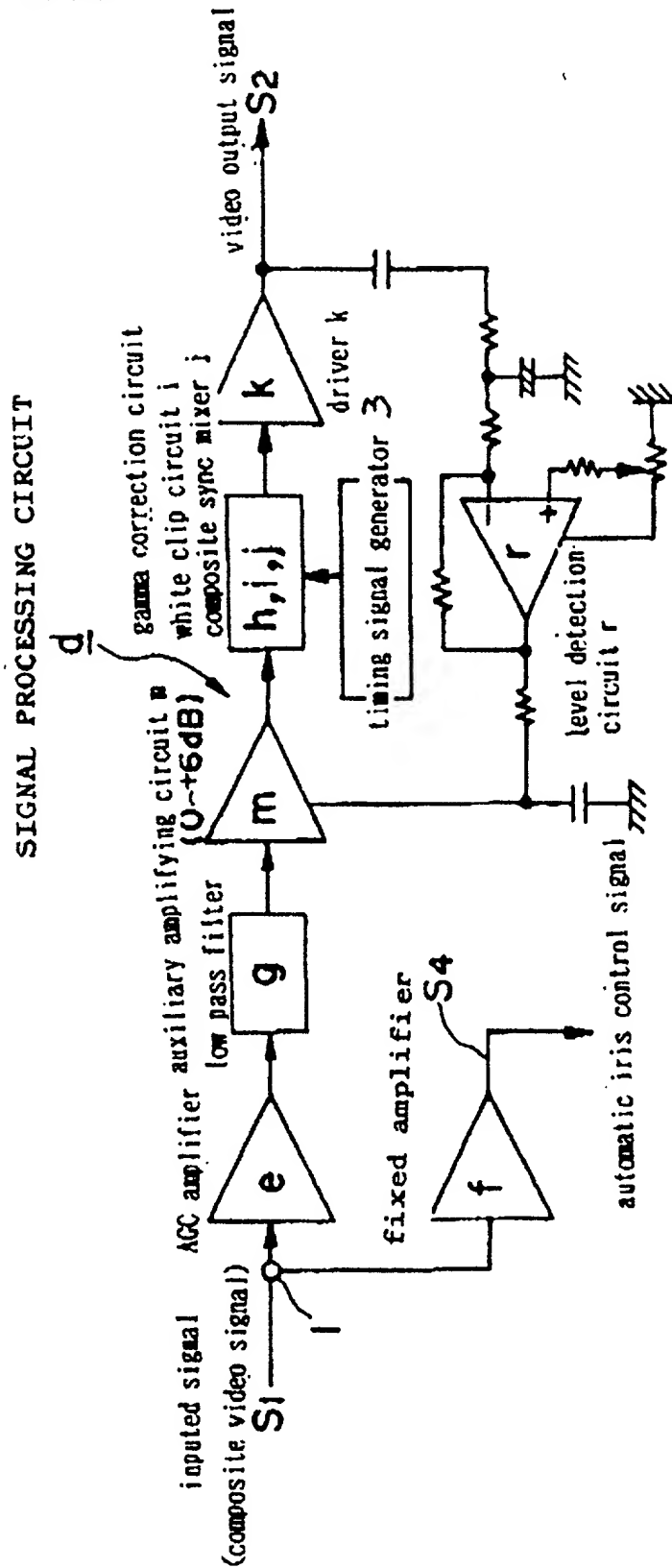
16. The method according to Claim 15 in which said step of selecting an automatic gain control auxiliary amplifier includes detecting a change in object illumination and signal level output voltage of said CCD signal amplifying and processing circuit.

ABSTRACT OF THE DISCLOSURE

Object: To broaden the range of photographing of object, until illumination of 0.02 lux.

Construction: In the case of sufficient bright object, photographing is performed by a conventional circuit at a high S/N ratio, at a high degree. In the case of an insufficient bright object, inserting auxiliary amplifying circuit  $m$ ,  $m_1$ ,  $m_2$  or  $em$  and ignoring the S/N ratio, and raising the amplification degree. In the case of sufficient bright object, photographing is performed by high S/N ratio, and high degree, in the case of insufficient bright object, an auxiliary amplifying circuit  $m$ ,  $m_1$ ,  $m_2$  or  $em$  is inserted ignoring the S/N ratio until utility noise composite of 20dB (10%).

Fig 1 embodiment 1



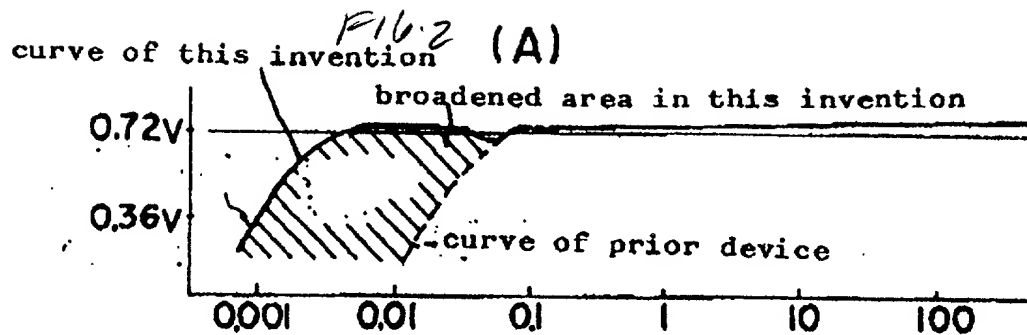


Fig 2 (A) object Lux (abscissa) and video output voltage (ordinate) of prior device (dotted line)

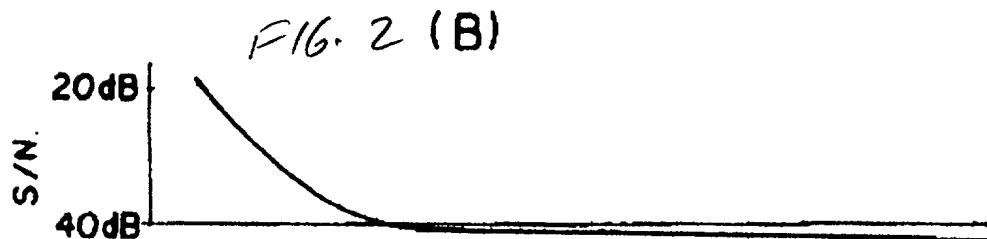


Fig 2 (B) object Lux (abscissa) and S/N ratio (ordinate) of this invention.

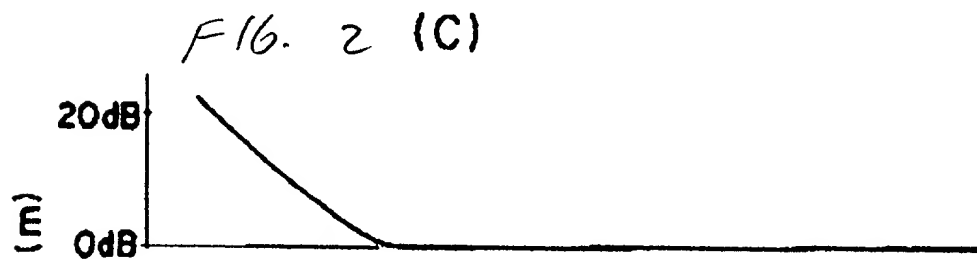
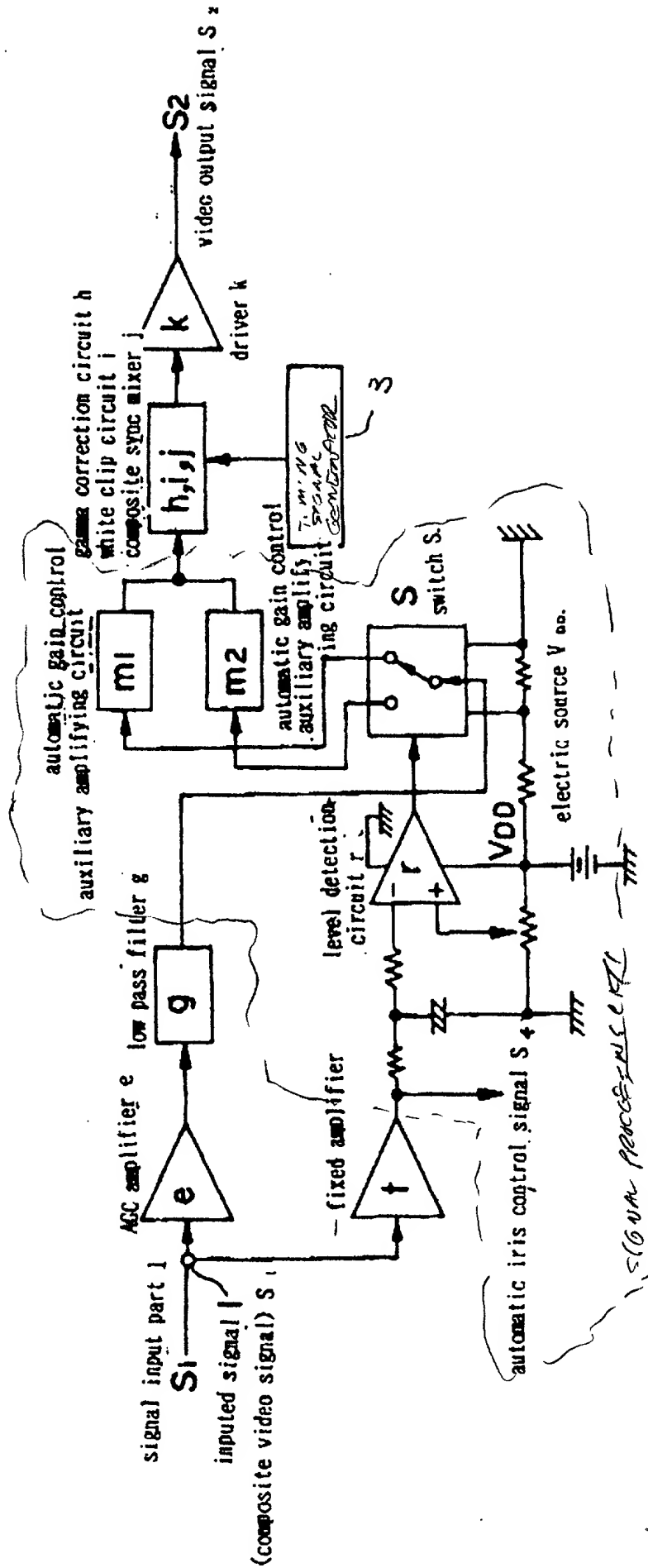


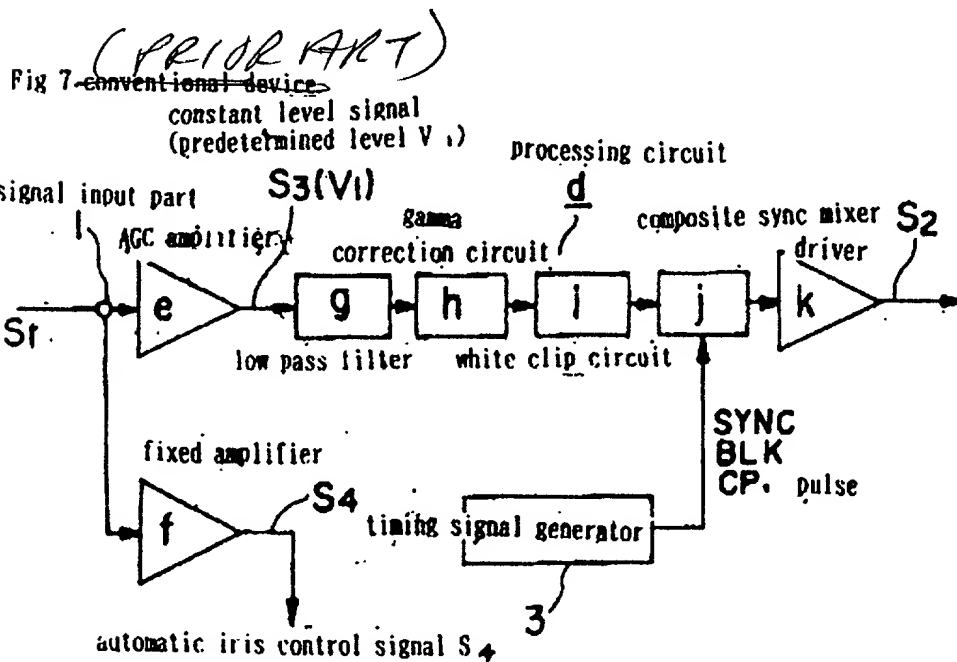
Fig 2(C) the relation of object Lux (abscissa) and gain of auxiliary amplifying circuit  $m$  (ordinate) of this invention.

[illegible]

Fig 3. Embedment-2

signal processing circuit d



[illegible]

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## Declaration and Power of Attorney For Patent Application

特許出願宣言書及び委任状

## Japanese Language Declaration

日本語宣言書

下<sup>ニ</sup>の氏名の発明者として、私は以下の通り宣言します。

As a below named inventor, I hereby declare that:

私の住所、私書箱、国籍は下記の私の氏名の後に記載された通りです。

**My residence, post office address and citizenship are as stated next to my name.**

下記の名称の発明に関して請求範囲に記載され、特許出願している発明内容について、私が最初かつ唯一の発明者（下記の氏名が一つの場合）もしくは最初かつ共同発明者であると（下記の名称が複数の場合）信じています。

**I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled**

SIGNAL AMPLIFYING CIRCUIT IN CCD CAMERA SIGNAL AMPLIFYING CIRCUIT IN CCD CAMERA

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☐ was filed on \_\_\_\_\_  
as United States Application Number or  
PCT International Application Number  
\_\_\_\_\_ and was amended on \_\_\_\_\_  
(if applicable).

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### Prior Foreign Application(s)

外国での先行出願

11-35603

(Number)  
(番号)

Japan

(Country)  
(国名)

15/2/99

(Day/Month/Year Filed)  
(出願年月日)

### Priority Not Claimed

優先権主張なし

☐

(Number)  
(番号)

(Country)  
(国名)

(Day/Month/Year Filed)  
(出願年月日)

☐

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(Application No.)  
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(Application No.)  
(出願番号)

(Filing Date)  
(出願日)

(Status Patented, Pending, Abandoned)  
(現況: 特許許可済、係属中、放棄済)

(Application No.)  
(出願番号)

(Filing Date)  
(出願日)

(Status Patented, Pending, Abandoned)  
(現況: 特許許可済、係属中、放棄済)

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I hereby claim foreign priority under Title 35, United States Code, Section 119 (a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below.

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s), or 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code Section 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of application.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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**Japanese Language Declaration**  
(日本語宣言書)

委任状: 私は下記の発明者として、本出願に関する一切の手続きを米特許商標局に対して遂行する弁理上または代理人として、下記の者を指名いたします。(弁護士、または代理人の氏名及び登録番号を明記のこと)

**POWER OF ATTORNEY:** As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith (list name and registration number)

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